

LocoMotive



Project no. 030089

LOCOMOTIVE

“Dissemination of knowledge concerning current R&D localisation motives of large regionally important private sector organizations”

Coordination Action

Regions of Knowledge 2

Final Report

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1. General Project Objectives

LOCOMOTIVE aimed at providing regional policy makers with a better understanding of the current R&D investment policies of large private sector companies in their regions compared with trends in other regions in Europe.

The chief tangible result was a study and associated dissemination activities on current R&D investment policies of selected major companies and their relation to regional strategies, together with proposals for how future regional and European Commission activities might better support R&D localisation in Europe. The study itself was used as a means to bring together R&D managers, regional policy makers, public administrators and public funded researchers to discuss ways to work together.

In this way LOCOMOTIVE addressed a missing link in the current Regions of Knowledge (RoK) and other DG Research policies targeted at regional development in that it tried to build a bridge to large scale private sector R&D investment. Taking a collective approach linking regions through this action and providing plenty of opportunity for cross-regional dialogue, benchmarking, and transferring best practice and research results extracted from other work, ensured the potential for high impact of the study on current thinking. LOCOMOTIVE was not only practical and 'hands-on', but also analytical and 'strategic' in orientation.

1.1 The context

LOCOMOTIVE considered the interface between large company research and development activities and technology driven SMEs. Rather than take the rather classical view of looking at needs of SMEs, which is well addressed in other parts of the Framework and other programmes, LOCOMOTIVE looked at the way large research organisations engage SMEs in their technology development. It is essential that this relationship is better understood by both entrepreneurs, particularly those not coming from a large company background, and policy makers who seek to encourage start-ups. For many hi-tech SMEs, it is contracts with large companies who can afford the risk in investing in their technologies which holds the key to successful business development.

R&D investment, organisation, and localisation by large companies is in a state of change making it difficult for regional policy makers to understand how these changes may affect their region, or indeed if they need to act to improve the attractiveness of their region. LOCOMOTIVE provided a vehicle to harness personal networks which allow a more trusting discussion of the issues relating to R&D localisation in Europe.

1.2 Research linked to this project

LOCOMOTIVE drew on resources and results established by on-going research work undertaken at Erasmus University and Interlace and in particular to a major research project on "Metropolitan Hubs, Dynamic Regions, Innovation Environments, and Governance in the Knowledge-Based Society", which explores the spatial or territorial foundations of a more knowledge-intensive European society with an increasingly innovation-rich economy turning globally competitive. LOCOMOTIVE related to this on-going research by using it on the one hand to guide the methodology applied by practitioners in conducting interviews and on the other to compare the perceptions given through personal contacts with what can be determined about global R&D organisation strategies from other sources. LOCOMOTIVE provided in return the opportunity to enhance Erasmus University database of R&D localisation performance indicators.

1.3 Link to policy makers

A key objective was to bridge the evident communication gap between "big" industry and regional policy maker. It was not the goal of LOCOMOTIVE to form policies, but to assist

those that do in gaining insights into the current strategic thinking within large companies concerning R&D localisation. It was not foreseen as the role of LOCOMOTIVE to move into highly sensitive political areas of lobbying by the big companies. What the project wanted to find out is how cluster conditions can be improved, or what close ties to a university might mean etc.

The involvement of policy makers is both direct and indirect: Many of the participating organisations are involved in regional development issues on behalf of public authorities or regional Governments. The interest in this project stems from a genuine interest to find out what could be done to improve collaboration between industry, research and regional Government. Secondly, the goal of the project is to pull together the lessons learned and to present these to policy makers. By having a wider spectrum of results to draw from, and the possibility to make inter-regional comparisons some of the tendency to base policy on “anecdotal information” can be avoided.

2. Objectives and Results

LOCOMOTIVE only had one reporting period originally covering 18 months and extended to 21 months through a contract amendment. Therefore this periodic report covers the whole duration of the project, the objectives being the same as described above.

2.1 Methodology

The project set out into analysing the location motives for R&D placement by large companies by developing a methodology which was later used for structured interviews with R&D managers of 42 organisations in 8 regions. Core part of the methodology is a questionnaire which consists of 9 open questions. Questions 1 to 5 ask about the motives for a firm to invest in the region, and what an R&D manager thinks are a region's weaknesses as R&D location. Questions 6-9 ask about the nature of the R&D activities that the MNE conducts in the region, and how these are linked to the other parts of the MNE organization. The final question then asks about links between the R&D subsidiary and the region. The design of the questionnaire was piloted with one interview per region, and modified according to the experience with this interview. To ensure comparability across regions and therefore also across interviewers, the interview questions are accompanied with instructions to the interviewer.

The methodology also describes the approach to the roundtable discussions. These are to be conducted in a much less formal way and are open to incorporate special regional interests. The methodology also states that stakeholder and roundtable discussions have to occur fairly late in the project to use the results from the interview summaries as input to the discussions. The methodology was described in deliverable D3 “Questionnaire for regional interviews”.

2.2 Interviews

The questionnaire forming part of the methodology was then used to conduct the interviews with the R&D managers. The firms selected for the interviews were chosen on the basis of the criteria that they were considered regionally important i.e. had considerable R&D activities in the region, and preferably also in one of the other partner regions, and that they are in the Fortune Global 500 list, for which Erasmus maintains data relating to R&D performance in its SCOPE Database. This means that the project focuses on some of the largest firms and R&D-players world wide and is able to link interview data with the SCOPE data (part of WP6). It also means that some cross-regional comparisons can be made.

The interviews have been conducted with the most senior directors/managers of MNE's R&D units. They are semi-structured in nature, with a limited number of open questions, based on the research themes. If necessary, the open questions have been followed-up by more specific questions for clarification, so that as much information as possible can be systematically obtained from subsequent content analysis of the interview transcripts.

The results of the interviews may be found in Deliverable 10 “Report on interviews with R&D managers“. The interview questions can be found in *Annex 1* of this report. These questions stem directly from the research themes identified above. Questions 1 to 5 ask about the motives for a firm to invest in the region, and what an R&D manager thinks are a region's weaknesses as R&D location. Questions 6-9 ask about the nature of the R&D activities that the MNE conducts in the region, and how these are linked to the other parts of the MNE organization. The final question then asks about links between the R&D subsidiary and the region.

The partners first conducted one interview to test the questionnaire and the results were compared at a project meeting at the beginning of April 2006. Since then a total of 42 interviews have been carried out. This exceeds the contractual obligation (of two per region making sixteen), but the partners are committed to conducting as many interviews as possible to improve the validity of the general findings.

In most cases the questionnaire was sent to the interviewees in advance. Interviewees were informed about the terms of confidentiality. In preparation for the interview, a “fact sheet” containing public data was prepared which in some cases was expanded on the basis of information received from the interviewees. *Annex 3* contains the fact-sheets for the interviews.

The results of the interviews are presented in the form of interview summaries in the remainder of this document. In addition, in order to further aggregate the results, the interview transcripts were also coded so that (be it relatively crude) quantitative variables could be obtained. A simple database has been built with a graphical user interface that facilitates coding and that also allows for comments, notes and examples for each variable (see *Annex 4* for a screenshot). This dataset will enable the project to systematically compare findings across regions, and to explore relationships among the three themes. Box 1 explains in detail how the variables have been coded; the results are presented in *section V*.

2.3 Roundtable Discussions

Based on the interviews, roundtable discussions were held in the participating regions with regional actors from industry, academia and administrations. The topics and the invitees to these roundtable discussions were left to the local organiser as the roundtables were supposed to follow the needs of the regions in the topics to be discussed. Also, the local partners were given an opportunity to identify the actors they wanted to become part of their network or whom they wanted closer contact with. The roundtable discussions are summarised in deliverable D9 “Summaries of roundtable discussions“. An overall view taking into account the background to the regions and both interviews and roundtable discussions may be found in deliverable D11 “Comparative report on R&D decisions of large private sector companies in selected regions“.

The results of the LocoMotive Regional Roundtables are summarized according to main points made or themes in the report. Here, it should be noted that each partner in the project has been responsible for delivering a summary of the roundtable deliberations held in their region according to an agreed structure. Each partner was responsible also for managing these regional stakeholder workshops and for delivering from these workshops a series of observations on top of or integrated with the summary account.

The regional roundtables were all aimed to assess broadly the situation regarding private sector investments in R&D in each selected region, especially with a view to understand the involvement of globally oriented companies as R&D investors. Focus has been on how to attract R&D investments (and related innovative activities) by multinational enterprises (MNEs).

An ambition behind of this part of the workpackage is to put the interviews with the R&D managers into the most relevant regional contexts for, later, to deduce both general and more specific recommendations to industry, to R&D institutions and to regional and other decision-makers in the public sector. It should be underlined that this deliverable (D 9) should

be a bridge between the company-level analysis and the global trends in R&D investments by multinational corporations. The report should help situate these two types of analyses in a context relevant to public policy-makers. However, a focus should remain on the identification of locational factors that could attract regional R&D investment by MNEs, and the way in which MNEs typically structure and organize their international R&D in relation to the European regions under scrutiny.

The presentations below have been organized into issue areas, developed also during the roundtable conversations with the companies and institutions involved. For further details of each regional roundtable or regional set of roundtables, please look at the individual reports from these roundtables, as documented by the regional teams.

2.4 Private Sector R&D: Global View

The pragmatic fact finding tour in the regions involved were supplemented by more global considerations on R&D decisions in large companies as laid out in deliverables D7 “Private Sector R&D: Global View”.

The Global Outsourcing of R&D has vast influence on the European Union especially as R&D investments have become a central topic on the European Agenda. As this report underlines, investments in R&D support the global economic growth and is as such beneficial to both the investing countries as well as the receiving countries. However, great care should be taken, on both the national and the industrial side, to ensure that the outsourcing of R&D is done with respect for the special circumstances under which the world is becoming increasingly global. This includes also sensitivity to economic as well cultural factors, of which the bestperforming multinational firms bear evidence through their successful outsourcing strategies.

The LocoMotive project aimed to provide a better understanding of the factors that influence where these MNEs locate their R&D, and how they organize their innovation efforts across borders, in order to help regional, national and European policy makers to better deal with these firms and maximize the benefits that result from their presence. This document is part of the LocoMotive project and documents in detail the R&D strategies of 8 of the largest technology-intensive firms in Europe: Airbus, Siemens, Philips, Nokia, Volkswagen, Motorola, Shell and GlaxoSmithKline.

The internationalization of R&D of these eight firms - and many other similar ones – goes beyond IT and business process operations, and can also include strategic activities, production, delivery of core products and services and sales and marketing. Although one of the key drivers of this trend is the quest for lower costs (engineers and researchers in regions outside Europe and the US are still much cheaper), access to knowledge and a highly educated workforce are equally important. Access to markets (and future markets) is a strong determinant of the growth of R&D towards India and China. The case studies confirm these impressions and highlight the combination of markets and technology as key locational determinants for R&D investment. The action of competitors is particularly relevant for companies that operate in consumer markets with relatively standardized products.

Yet there are also several impediments. Coordination costs and scale economies favour locating R&D in one single (often headquarter) location, rather than abroad. Insufficient tangible (airport, roads) and intangible infrastructure (legal environment) in host locations often make it impossible to locate R&D elsewhere. Factors related to quality and quality control, as well as IPR concerns, are further impediments. Lack of a common language and cultural differences also make internationalization of R&D difficult. The majority of firms in the case studies has opted to manage their international network organization like networks of interconnected centres of excellence and product development. But when policy influence via e.g. government procurement is large a more ‘multidomestic’ R&D strategy can be observed. Historical path dependencies, such as a strong headquarter or instead relatively autonomous brands within a group, continue to influence the organizational structure of R&D substantially.

2.4 Study visit to Toronto Ontario

A feature inbuilt into the project was to find a region for comparison outside the European Union. The region around Toronto, Ontario (Canada), was selected since it is both an innovation hot spot, but also considered culturally more similar to Europe than other locations in the USA or Asia. Therefore a study visit to Toronto was conducted in April 2007.

The visit was organised with the help of David Wolfe, Professor of Political Science at the University of Toronto at Mississauga and Co-Director of the Program on Globalization and Regional Innovation Systems (PROGRIS) at the **Munk Centre for International Studies (MCIS) at the University of Toronto**.

PROGRIS (http://www.utoronto.ca/progris/web_files/aboutus.htm) serves as the national secretariat for the Innovation Systems Research Network (ISRN), funded by the Social Sciences and Humanities Research Council of Canada. Professor David Wolfe is National Coordinator of the ISRN and from 2001 to 2005 he was the Principal Investigator on its Major Collaborative Research Initiative grant on *Innovation Systems and Economic Development: the Role of Local and Regional Clusters in Canada*, a comparative study of twenty-six industrial clusters across Canada. Along with Meric Gertler, he has recently been awarded a new MCRI grant from SSHRC on the *Social Dynamics of Economic Performance: Innovation and Creativity in City Regions* which runs from 2006 to 2010.

The members of the LOCOMOTIVE party found the visit very inspiring and certainly were able to add fresh thoughts to their regional thinking. Summarising the comments made after the visit, it struck many of them as stunning how similar approaches and problems were to comparable regions in Europe. The main contrast seemed to be the proximity of the Toronto region to the US, which led to a much stronger focus on the innovation situation in the neighbouring country than it would be in Europe. Also many of the problems concerning innovation arise from the relationship to MNEs in the US. The report of the visit may be found in deliverable D8 "Visit Report Toronto".

2.5 LOCOMOTIVE Conference

All results of the LOCOMOTIVE project were presented and discussed during a public conference held in Hamburg on "Managing the Links - Global trends and regional policies in R&D location" on 5 and 6 June 2007. 60 experts from industry, universities and administrations had discussed the question, how decisions of large companies to locate R&D in a particular region may be influenced. The participants agreed that a location of important research and development investors in Europe will only be possible if the regions harmonised their locational and fiscal policies and will be guided less by competing against each other. In addition universities should concentrate more on their research strengths and not to try to offer the full spectrum of possible or fashionable topics in research. A detailed report of the conference may be found in deliverable D13 "Proceedings of final LOCOMOTIVE conference".

2.6 Policy Recommendations

Taking the summaries from the roundtable discussions and from the conference, the LOCOMOTIVE project finally condensed its findings into a document giving recommendations on the regional aspects of R&D location. As can be expected in the case of such a cooperative project, the collaboration has brought to light many interesting and relevant dimensions and concerns (regional, European, sectoral, academic vs policy oriented, private vs public, etc.) not all of which can be taken on board in such a summary report. Further, it is understood that LOCOMOTIVE has focused on 'what to do', i.e. objectives and priorities. One way to continue the work initiated in LOCOMOTIVE would be to investigate in more details the 'hows', i.e. the means and methods best suited to the realisation of these ends.

The report brings together the conclusions and recommendations derived from the core LOCOMOTIVE activities. There was general agreement among LOCOMOTIVE participants

on all of the main points to be discussed in the general recommendations. At the same time, it was also found that the discussion needs to be continued on a number of concrete issues. These include the question to what extent support for mobility and immigration inside and outside the European Union creates the threat of brain-drain in less competitive regions. Further, the assessment of priorities has also diverged as to whether R&D is best promoted by providing incentives directly for R&D activities of MNEs or by 'enabling' domestic local actors to contribute more effectively to these activities. Similarly, it is unclear at this point whether the knowledge-base profits most from strengthening 'mass education' or rather from more focus support for elite educational programs. Finally, there is no doubt that there exist significant structural differences between the economies and regulatory environments of regions in old as opposed to new members states. These differences must be explored further and need to be taken into account in the development and implementation of policies.

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3. Conclusions

Analyses of interviews with R&D managers of MNEs at both regional and sectoral levels proved that technology/supply side factors are the key determinants which strongly influence decision-making at MNEs in locating and keeping R&D in regions. The technology-related factors were important in all selected regions and in all industrial sectors. Particularly, the availability of a skilled labour force and researchers, proximity to a university or research laboratories, and an easy access to research results can be ranked among the most important technology-related determinants, which positively influenced location of R&D activities in the past and keeping R&D in the region at present.

In the more developed regions and in regions with a higher innovation potential the localisation is positively influenced also by the presence of other important/large (high-tech) companies in the region, which provide relevant services to MNEs. Also an acceptable regulatory environment and a favourable taxation system increase the attractiveness of the region for localisation/keeping R&D activities.

Most Interviewed companies had their headquarters and a strong R&D base in the EU-15 countries or in the USA. Localisation (or shift) of R&D activities of these companies to less developed regions (i.e. in the Prague and Budapest regions in the early 1990s) was positively influenced particularly by presence of a quality and cheap labour force and a suitable R&D infrastructure and experience in R&D (for instance in public research institutes or in large state-owned companies) in these regions. A positive influence can be also attributed to the geographical proximity and accessibility of these regions from the EU-15 countries as well as to their cultural proximity to western countries.

The technology-related factors were also mentioned as the most important weaknesses in all regions. Insufficient quality of educational systems, lack of qualified labour force, difficulties for MNEs in cooperating with universities and public R&D laboratories were very often mentioned as weaknesses in all regions covered by this study. The difficulty to attract and integrate non-Europeans, particularly highly qualified workers and researchers, is probably a global European weakness at present. Another problem, which was mentioned in some regions, is the thematic and regional fragmentation of public R&D subsidies (for instance overlapping and too small projects).

An unattractive tax environment (particularly high personal taxation) and high costs of living in more economically developed regions, which usually result in high R&D costs, can

decrease the attractiveness for keeping R&D in these regions and can cause the relocalisation of R&D to countries with cheaper labour force and lower R&D costs.

On the other hand, weaknesses, which may be caused by the yet unfinished transition to a more advanced educational and research system, which is common for the EU-15 countries, were revealed in the new member states' regions. For instance, insufficient protection of intellectual property, non-stable tax and regulation system, insufficient quality of public administration and a low entrepreneurial spirit of people were mentioned by R&D managers in these regions. Also an absence of a common and complex concept (policy) of R&D, education and business (insufficient harmonisation of the science policy with the education and economic policy system) was stated as a weakness for localisation of private R&D in these countries.

Localisation motives at the sectoral level differ namely in compliance with the continuing process of economic globalisation that implicates decentralisation or even relocation of economic activities. Globalisation influences especially the electric industry. Acquisitions remain an important localisation factor in chemistry and pharmaceuticals. Main milestones of individual sectors are these: support programmes and incentives in ICT, R&D expansion to China and India leading to establishing new R&D capacities and deepening specialisation in the electric sector and R&D expansion in accordance with the expansion of chemistry and pharmaceuticals.

The results of interviews and revealed key localisation determinants are in compliance with recent studies focused on internationalisation and globalisation of R&D.

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